William N Shafarman

List of Publications by Year
in descending order

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115	3,885	257357	128225
papers	citations	24 h-index	60 g-index

118	118	118	3332
all docs	docs citations	times ranked	citing authors

#	Article	IF	Citations
1	Thin-film solar cells: device measurements and analysis. Progress in Photovoltaics: Research and Applications, 2004, 12, 155-176.	4.4	994
2	Development of CuInSe₂ Nanocrystal and Nanoring Inks for Low-Cost Solar Cells. Nano Letters, 2008, 8, 2982-2987.	4.5	545
3	Bulk and metastable defects in CuIn1âˆ'xGaxSe2 thin films using drive-level capacitance profiling. Journal of Applied Physics, 2004, 95, 1000-1010.	1.1	425
4	Device and material characterization of Cu(InGa)Se2 solar cells with increasing band gap. Journal of Applied Physics, 1996, 79, 7324-7328.	1.1	263
5	Effect of substrate temperature and depostion profile on evaporated Cu(InGa)Se 2 films and devices. Thin Solid Films, 2000, 361-362, 473-477.	0.8	92
6	Three-step H2Se/Ar/H2S reaction of Cu-In-Ga precursors for controlled composition and adhesion of Cu(In,Ga)(Se,S)2 thin films. Journal of Applied Physics, 2012, 111, .	1.1	81
7	The determination of carrier mobilities in CIGS photovoltaic devices using high-frequency admittance measurements. Thin Solid Films, 2005, 480-481, 336-340.	0.8	80
8	The electronic structure of Cu(In1âˆ'xGax)Se2 alloyed with silver. Thin Solid Films, 2011, 519, 7296-7299.	0.8	72
9	High <italic>V</italic>_{oc} in (Cu,Ag)(In,Ga)Se₂ Solar Cells. IEEE Journal of Photovoltaics, 2017, 7, 1789-1794.	1.5	72
10	Structural and optical properties of (Ag,Cu)(In,Ga)Se2 polycrystalline thin film alloys. Journal of Applied Physics, 2014, 115, .	1.1	67
11	The influence of Na on metastable defect kinetics in CIGS materials. Thin Solid Films, 2009, 517, 2277-2281.	0.8	62
12	The Comparison of (Ag,Cu)(In,Ga)Se$_{f 2}$ and Cu(In,Ga)Se$_{f 2}$ Thin Films Deposited by Three-Stage Coevaporation. IEEE Journal of Photovoltaics, 2014, 4, 447-451.	1.5	58
13	Structure and interface chemistry of MoO₃ back contacts in Cu(In,Ga)Se₂ thin film solar cells. Journal of Applied Physics, 2014, 115, 033514.	1.1	51
14	Cu(InGa)Se2 Solar Cells. , 2005, , 567-616.		46
15	Comparison of Ag and Ga alloying in low bandgap CuInSe2-based solar cells. Solar Energy Materials and Solar Cells, 2019, 195, 155-159.	3.0	45
16	Grain engineering: How nanoscale inhomogeneities can control charge collection in solar cells. Nano Energy, 2017, 32, 488-493.	8.2	40
17	Cu(In,Ga)Se2 film formation from selenization of mixed metal/metalâ€“selenide precursors. Solar Energy Materials and Solar Cells, 2010, 94, 451-456.	3.0	39
18	Cu(InGa)Se2 solar cells on a flexible polymer web. Progress in Photovoltaics: Research and Applications, 2005, 13, 141-148.	4.4	36

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19	Ga homogenization by simultaneous H2Se/H2S reaction of Cu-Gaâ€“In precursor. Solar Energy Materials and Solar Cells, 2011, 95, 235-238.	3.0	34
20	Composition and bandgap control in Cu(In,Ga)Se₂ -based absorbers formed by reaction of metal precursors. Progress in Photovoltaics: Research and Applications, 2015, 23, 765-772.	4.4	34
21	Surface sulfurization studies of Cu(InGa)Se2 thin film. Solar Energy Materials and Solar Cells, 2006, 90, 623-630.	3.0	33
22	Alternative device structures for CIGS-based solar cells with semi-transparent absorbers. Nano Energy, 2016, 30, 488-493.	8.2	32
23	Bandgap gradients in (Ag,Cu)(In,Ga)Se2 thin film solar cells deposited by three-stage co-evaporation. , 2015, , .		31
24	Metastable properties of Cu(In1â^'xGax)Se2 with and without sodium. Applied Physics Letters, 2011, 98, .	1.5	30
25	Improved Performance of Ultrathin Cu(InGa)Se<inline-formula><tex-math>$_{f 2}$</tex-math></inline-formula> Solar Cells With a Backwall Superstrate Configuration. IEEE Journal of Photovoltaics, 2014, 4, 1630-1635.	1.5	28
26	Characterization of (AgCu)(InGa)Se$_{f 2}$ Absorber Layer Fabricated by a Selenization Process from Metal Precursor. IEEE Journal of Photovoltaics, 2013, 3, 467-471.	1.5	25
27	Comparison of CIGS Solar Cells Made With Different Structures and Fabrication Techniques. IEEE Journal of Photovoltaics, 2017, 7, 286-293.	1.5	25
28	Five-source PVD for the deposition of Cu(In1â^'xGax)(Se1â^'ySy)2 absorber layers. Thin Solid Films, 2005, 480-481, 33-36.	0.8	23
29	Characterization and device performance of (AgCu)(InGa)Se<inf>2</inf> absorber layers. , 2009, , .		23
30	Characterizing the effects of silver alloying in chalcopyrite CIGS with junction capacitance methods. Materials Research Society Symposia Proceedings, 2009, 1165, 1.	0.1	23
31	Effect Of Grain Size, Morphology and Deposition Temperature on Cu(InGa)Se₂ Solar Cells. Materials Research Society Symposia Proceedings, 2001, 668, 1.	0.1	21
32	Effect of Reduced Cu(InGa)(SeS)$_{m 2}$ Thickness Using Three-Step H$_{m 2}$Se/Ar/H$_{m 2}$S Reaction of Cuâ€“Inâ€“Ga Metal Precursor. IEEE Journal of Photovoltaics, 2013, 3, 446-450.	1.5	21
33	Device characterization of (AgCu)(InGa)Se<inf>2</inf> solar cells. , 2010, , .		19
34	Ag Alloying and KF Treatment Effects on Low Bandgap CuInSe₂ Solar Cells. IEEE Journal of Photovoltaics, 2019, 9, 906-911.	1.5	19
35	Secondary phase formation in (Ag,Cu)(In,Ga)Se2 thin films grown by three-stage co-evaporation. Solar Energy Materials and Solar Cells, 2017, 166, 18-26.	3.0	17
36	Influence of Ga and Ag on the KF Treatment Chemistry for CIGS Solar Cells. IEEE Journal of Photovoltaics, 2019, 9, 1846-1851.	1.5	17

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37	Characterization of Cu(InGa)Se2 Solar Cells using Etched Absorber Layers. , 2006, , .		14
38	Wide-bandgap (AgCu)(InGa)Se<inf>2</inf> absorber layers deposited by three-stage co-evaporation. , 2010, , .		14
39	Detailed study of metastable effects in the Cu(InGa)Se₂ alloys: Test of defect creation models. Materials Research Society Symposia Proceedings, 2005, 865, 1241.	0.1	13
40	MoO₃ back contact for CuInSe₂-based thin film solar cells. Materials Research Society Symposia Proceedings, 2013, 1538, 173-178.	0.1	13
41	Optical and quantum efficiency analysis of (Ag,Cu)(In,Ga)Se<inf>2</inf> absorber layers. , 2009, , .		12
42	Development of Cu(In,Ga)Se2 superstrate devices with alternative buffer layers. Solar Energy Materials and Solar Cells, 2016, 157, 85-92.	3.0	12
43	Agâ€“Cuâ€“Inâ€“Ga Metal Precursor Thin Films for (Ag,Cu)(In,Ga)Se2 Solar Cells. IEEE Journal of Photovoltaics, 2017, 7, 273-280.	1.5	12
44	Effect of sputtering sequence on the properties of Ag-Cu-In-Ga metal precursors and reacted (Ag,Cu)(In,Ga)Se<inf>2</inf> films. , 2014, , .		11
45	The growth of methylammonium lead iodide perovskites by close space vapor transport. RSC Advances, 2020, 10, 16125-16131.	1.7	11
46	Post-Deposition Sulfur Incorporation into CuInSe₂ Thin Films. Materials Research Society Symposia Proceedings, 2001, 668, 1.	0.1	10
47	Control of Ga profiles in (AgCu)(InGa)Se<inf>2</inf> absorber layers deposited on polyimide substrates. , 2012, , .		10
48	Formation of Ga₂O₃ barrier layer in Cu(InGa)Se₂ superstrate devices with ZnO buffer layer. Materials Research Society Symposia Proceedings, 2013, 1538, 67-72.	0.1	10
49	An improved method for determining carrier densities via drive level capacitance profiling. Applied Physics Letters, 2017, 110, 203901.	1.5	10
50	Defects in Copper Indium Aluminum Diselenide Films and their Impact on Photovoltaic Device Performance. Materials Research Society Symposia Proceedings, 2003, 763, 921.	0.1	9
51	Characterization of group I-rich growth during (Ag,Cu)(In,Ga)Se<inf>2</inf> three-stage co-evaporation. , 2014, , .		9
52	Design and experimental implementation of an effective control system for thin film Cu(InGa)Se2 production via rapid thermal processing. Journal of Process Control, 2016, 46, 24-33.	1.7	9
53	Thermal and Structural Characterization of Methylammoniumâ€•and Formamidiniumâ€Halide Salts. Physica Status Solidi (A) Applications and Materials Science, 0, , 2100246.	0.8	8
54	Microstructure and phase evolution in single phase CuInSe2 particles synthesized using elemental precursors. Journal of Solid State Chemistry, 2014, 213, 198-203.	1.4	7

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55	Reaction pathway analysis of Ag-alloyed Cu(In, Ga)Se<inf>2</inf> absorber materials. , 2016, , .		7
56	Effect of reaction temperature and time during two-step selenization and sulfurization of Se-Coated CuGa/In precursors. Electronic Materials Letters, 2016, 12, 484-493.	1.0	7
57	Phase stability in Ag-Cu-In-Ga metal precursors for (Ag,Cu)(In,Ga)Se2 thin films. Solar Energy Materials and Solar Cells, 2017, 172, 347-352.	3.0	7
58	Reaction Rate Enhancement for Cu(In,Ga)Se₂ Absorber Materials Using Ag-Alloying. IEEE Journal of Photovoltaics, 2019, 9, 898-905.	1.5	7
59	Effect of reaction temperature on Cu(InGa)(SeS)<inf>2</inf> formation by a sequential H<inf>2</inf>Se/H<inf>2</inf>S precursor reaction process. Conference Record of the IEEE Photovoltaic Specialists Conference, 2008, , .	0.0	6
60	Light Trapping in Thin-Film Cu(InGa)Se$_{2}$ Solar Cells. IEEE Journal of Photovoltaics, 2014, 4, 948-953.	1.5	6
61	Na Incorporation in Cu(In,Ga)(Se,S)₂ Films Grown on Insulator-Coated Stainless Steel Foil Using a Metal Precursor Reaction. IEEE Journal of Photovoltaics, 2015, 5, 1222-1228.	1.5	6
62	Reaction pathway analysis of (AgxCu1â^'x)(In0.75Ga0.25)Se2 with x = 0.75 and 1.0. Solar Energy Materials and Solar Cells, 2018, 182, 142-157.	3.0	6
63	Study of the Electronic Properties of Matched Na-Containing and Reduced-Na CuInGaSe2 Samples Using Junction Capacitance Methods. Materials Research Society Symposia Proceedings, 2007, 1012, 1.	0.1	5
64	Distinguishing bulk and surface recombination in CdTe thin films and solar cells using time-resolved terahertz and photoluminescence spectroscopies. Journal of Applied Physics, 2021, 130, .	1.1	5
65	Characterization of the Electronic Properties of Wide Bandgap CuIn(SeS)2 Alloys. Materials Research Society Symposia Proceedings, 2005, 865, 1631.	0.1	4
66	Ga distribution and adhesion issues in selenization of metallic Cu-Ga-In precursors. , 2009, , .		4
67	H2S reaction of Se-capped metallic precursors to form Cu(In,Ga)(S,Se)<inf>2</inf> absorber layers. , 2014, , .		4
68	Synchrotron x-ray characterization of alkali elements at grain boundaries in Cu(In, Ga)Se<inf>2</inf> solar cells. , 2016, , .		4
69	A quaternary Laves-type phase in Ag-Cu-In-Ga thin films. Journal of Alloys and Compounds, 2017, 710, 819-824.	2.8	4
70	Semiconductor processing and manufacturing. Progress in Photovoltaics: Research and Applications, 1997, 5, 359-364.	4.4	3
71	Energetics of Both Minority and Majority Carrier Transitions through Deep Defects in Wide Bandgap Pentenary Cu(In,Ga)(Se,S)₂ Thin Film Solar Cells. Materials Research Society Symposia Proceedings, 2007, 1012, 1.	0.1	3
72	In-situ annealing of Cu(In,Ga)Se<inf>2</inf> films grown by elemental co-evaporation. Conference Record of the IEEE Photovoltaic Specialists Conference, 2008, , .	0.0	3

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73	Composition control of Cu(InGa)(SeS)2 deposited by elemental coevaporation. Journal of Applied Physics, 2008, 104, 034912.	1.1	3
74	Cu(InGa)Se2 photovoltaics on insulated Stainless Steel Web substrate. , 2010, , .		3
75	In-situ resistance measurement during the growth of Cu(In, Ga)Se<inf>2</inf> films by multi-source evaporation. , 2013, , .		3
76	Incorporation of Sb, Bi, and Te Interlayers at the Mo/Cu-In-Ga Interface for the Reaction of Cu(In,Ga)(Se,S)₂. Materials Research Society Symposia Proceedings, 2013, 1538, 15-20.	0.1	3
77	Voltage-Induced Charge Redistribution in Cu(In,Ga)Se₂ Devices Studied With High-Speed Capacitanceâ€“Voltage Profiling. IEEE Journal of Photovoltaics, 2019, 9, 319-324.	1.5	3
78	Preparation of Wide Bandgap Cu(InGa)(SeS)2 Solar Cells with Improved Fill Factor. , 2006, , .		2
79	Composition Control in the Deposition of Cu(InGa)(SeS)₂Thin Films. Materials Research Society Symposia Proceedings, 2007, 1012, 1.	0.1	2
80	Cu-In-Ga metal precursors sputter deposited from a single ternary target for Cu(InGa)(SeS)<inf>2</inf> film formation. , 2011, , .		2
81	Characterization and numerical modeling of Cu(In,Ga)(S,Se)2 solar cells. , 2015, , .		2
82	Role of Cation Ordering on Device Performance in (Ag,Cu)InSe₂ Solar Cells with KF Post-Deposition Treatment. ACS Applied Energy Materials, 2021, 4, 233-241.	2.5	2
83	Transparent conducting oxide contacts for n-i-p and p-i-n amorphous silicon solar cells. AIP Conference Proceedings, 1997, , .	0.3	1
84	Role of Bulk Defect States in Limiting CIGS Device Properties. , 2006, , .		1
85	Electronic Properties of Wide Bandgap Pentenary Chalcopyrite Alloys and Their Photovoltaic Devices. , 2006, , .		1
86	Cu(In,Ga)Se<inf>2</inf> film formation from selenization of mixed metal/metal-selenide precursors. Conference Record of the IEEE Photovoltaic Specialists Conference, 2008, , .	0.0	1
87	In-situ post-deposition thermal annealing of co-evaporated Cu(InGa)Se<inf>2</inf> thin films deposited at low temperatures. , 2009, , .		1
88	Effects of Ga Compositional Grading on CIGS Electronic Properties Relevant to Solar Cell Performance. Materials Research Society Symposia Proceedings, 2009, 1165, 1.	0.1	1
89	Electrical and compositional characterization of gallium grading in Cu(In,Ga)Se<inf>2</inf> solar cells. , 2014, , .		1
90	VOC enhancement of sub-micron CIGS solar cells by sulfization of the Mo surface. , 2015, , .		1

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91	A stochastic model of solid state thin film deposition: Application to chalcopyrite growth. AIP Advances, 2016, 6, 045015.	0.6	1
92	Precursor reaction method with high Ga Cu(In,Ga)(S,Se)2 to achieve increased open-circuit voltage. , 2019, , .		1
93	Investigation of the Electrical Properties of Grain Boundaries in (Ag_xCu_{1-x})(In_yGa_{1-y})Se₂. , 2019, , .		1
94	Precursor Reaction Method With High Ga Cu(In,Ga)(S,Se)$_{2}$ to Achieve Increased Open-Circuit Voltage. IEEE Journal of Photovoltaics, 2020, 10, 1185-1190.	1.5	1
95	The Role of Oxygen Exposure on the Performance of All-Vapor-Processed Perovskite Solar Cells with CuPC Hole Transport Layers. , 2021, , .		1
96	Substrate-Dependent Effects on the Growth of Methylammonium Lead Iodide Perovskites via Close Space Vapor Transport. , 2020, , .		1
97	Chemical process and device analysis of CuInSe2-based solar cell materials. AIP Conference Proceedings, 1994, , .	0.3	0
98	Understanding Metastable Defect Creation in CIGS by Detailed Device Modeling and Measurements on Bifacial Solar Cells. Materials Research Society Symposia Proceedings, 2007, 1012, 1.	0.1	0
99	Electronic Defects and Device Performance in CuGaSe2 Solar Cells. Materials Research Society Symposia Proceedings, 2007, 1012, 1.	0.1	0
100	Control of composition in co-evaporated Cu(InGa)(SeS)<inf>2</inf> thin films. Conference Record of the IEEE Photovoltaic Specialists Conference, 2008, , .	0.0	0
101	Electroabsorption Measurements on Bifacial CIGS Solar Cell Devices. Materials Research Society Symposia Proceedings, 2009, 1165, 1.	0.1	0
102	Effect of reduced Cu(InGa)(SeS)<inf>2</inf> thickness using three-step H<inf>2</inf>Se/Ar/H<inf>2</inf>S reaction of Cu-In-Ga metal precursor. , 2012, , .		0
103	+Three-step H<inf>2</inf>Se/Ar/H<inf>2</inf>S reaction of metal precursors for large area Cu(In,Ga)(Se,S)<inf>2</inf> with uniform Ga distribution. , 2012, , .		0
104	The effect of a high temperature reaction of Cu-In-Ga metallic precursors on the formation of Cu(In,Ga)(Se,S)2. Materials Research Society Symposia Proceedings, 2013, 1538, 3-8.	0.1	0
105	Effect of reduced Cu(InGa)(SeS)<inf>2</inf> thickness using three-step H<inf>2</inf>Se/Ar/H<inf>2</inf>S reaction of Cu-In-Ga metal precursor. , 2013, , .		0
106	+Three-step H<inf>2</inf>Se/Ar/H<inf>2</inf>S reaction of metal precursors for large area Cu(In,Ga)(Se,S)<inf>2</inf> with uniform Ga distribution. , 2013, , .		0
107	Sputtered zinc selenide buffer layers for Cu(InGa)Se<inf>2</inf> substrate and superstrate solar cells. , 2014, , .		0
108	A stochastic model for Cu(InGa)(SeS)2 absorber growth during selenization/sulfization. , 2015, , .		0

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109	The role of the intrinsic zinc oxide layers on the performance of wide-bandgap (AgCu)(InGa)Se2 thin-film solar cells. , 2015, , .		0
110	RTP-Assisted Ex-Situ Analysis of (Ag,Cu)(In,Ga)Se2 Formation using Selenization. , 2017, , .		0
111	Characterization and Simulation of Electronic Effects of Front Bandgap Gradients in Selenized/Sulfized Cu(In,Ga)(Se,S)2 Solar Cells. , 2018, , .		0
112	Towards Perovskite Vapor Transport Deposition: PbI2 Deposition and Modeling in a Close Space Vapor Transport Configuration. , 2021, , .		0
113	Quantifying Bulk and Surface Recombination in CdTe Solar Cells Using Time-Resolved Terahertz Spectroscopy. , 2021, , .		0
114	Formation of Ag(Ga, In)Se2 During Selenization of Ag-Ga/In Precursor. , 2020, , .		0
115	Phase evolution and morphology in Cu-In-Ga sputtered precursors. Journal of Vacuum Science and Technology A: Vacuum, Surfaces and Films, 2022, 40, 033402.	0.9	0